What is claimed is:

1       1.      A data structure comprising:

2       a root node, the root node including a number of sequential keys, each key including a

3              first value and a second value, the first and second values of each key defining a

4              range for that key, wherein the ranges of the number of key are non-overlapping;

5              and

6       a pointer associated with the root node, the pointer identifying a child node, the child

7              node having a range outside the range of each key in the root node.

1       2.      The data structure of claim 1, wherein at least one of the keys of the root

2       node further includes a data element.

1       3.      The data structure of claim 1, wherein at least one of the keys of the root

2       node further includes a pointer to an associated data element.

1       4.      The data structure of claim 1, wherein the first value includes a lower

2       bound of the range and the second value includes an upper bound of the range.

1       5.      The data structure of claim 1, wherein one of the keys of the root node

2       includes a pointer to a set of data elements.

1      6.     The data structure of claim 5, wherein the set of data elements comprises a

2   linked list.

1      7.     The data structure of claim 5, wherein each data element of the set is

2   associated with the range of the one key.

1      8.     The data structure of claim 5, wherein one data element of the set is

2   further associated with another one of the keys of the root node.

1      9.     The data structure of claim 5, wherein the set of data elements is

2   prioritized.

1      10.    The data structure of claim 9, wherein a highest priority data element of

2   the set of data elements corresponds to a data element having a longest length prefix.

1      11.    The data structure of claim 1, further comprising a temporary node

2   including a number of keys that is less than a minimum number of keys.

1      12.    The data structure of claim 1, further comprising a temporary key, the

2   temporary key having a range overlapping with the range of at least one of the keys in the

3   root node.

1       13.    The data structure of claim 1, wherein the range of the child node is

2    between the ranges of two sequential keys.

1       14.    The data structure of claim 1, wherein the range of the child node is

2    beyond the range of an end key of the number of keys.

1       15.    The data structure of claim 1, wherein the range of each of the keys

2    corresponds to a range of network addresses.

1       16.    The data structure of claim 1, wherein the root node and the child node

2    comprise a B-Tree data structure.

1       17.    The data structure of claim 1, wherein the data structure is capable of

2    being stored in a machine readable medium.

1       18.    The data structure of claim 1, wherein the machine readable medium

2    comprises one of a memory device, a carrier wave, an optical storage device, and a

3    magnetic storage device.

1    19.    A method comprising:

2    storing in a memory a root node, the root node including a number of sequential keys,

3            each key including a first value and a second value, the first and second values of

4            each key defining a range for that key, wherein the ranges of the number of key

5            are non-overlapping; and

6    storing in the memory a pointer associated with the root node, the pointer identifying a

7            child node, the child node having a range outside the range of each key in the root

8            node.

1    20.    The method of claim 19, wherein at least one of the keys of the root node

2    further includes a data element.

1    21.    The method of claim 19, wherein at least one of the keys of the root node

2    further includes a pointer to an associated data element.

1    22.    The method of claim 19, wherein the first value includes a lower bound of

2    the range and the second value includes an upper bound of the range.

1    23.    The method of claim 19, wherein one of the keys of the root node includes

2    a pointer to a set of data elements.

1      24.    The method of claim 23, wherein the set of data elements comprises a

2    linked list.

1      25.    The method of claim 23, wherein each data element of the set is associated

2    with the range of the one key.

1      26.    The method of claim 23, wherein one data element of the set is further

2    associated with another one of the keys of the root node.

1      27.    The method of claim 23, wherein the set of data elements is prioritized.

1      28.    The method of claim 27, wherein a highest priority data element of the set

2    of data elements corresponds to a data element having a longest length prefix.

1      29.    The method of claim 19, further comprising storing in the memory a

2    temporary node including a number of keys that is less than a minimum number of keys.

1      30.    The method of claim 19, further comprising storing in the memory a

2    temporary key, the temporary key having a range overlapping with the range of at least

3    one of the keys in the root node.

1     31.    The method of claim 19, wherein the range of the child node is between

2    the ranges of two sequential keys.

1     32.    The method of claim 19, wherein the range of the child node is beyond the

2    range of an end key of the number of keys.

1     33.    The method of claim 19, wherein the number of sequential keys are stored

2    in contiguous memory locations of the memory.

1     34.    An apparatus comprising:

2    a memory having a data structure stored therein, the data structure including

3               a root node, the root node including a number of sequential keys, each key

4                     including a first value and a second value, the first and second

5                     values of each key defining a range for that key, wherein the ranges

6                     of the number of key are non-overlapping, and

7               a pointer associated with the root node, the pointer identifying a child

8                     node, the child node having a range outside the range of each key

9                     in the root node.

1     35.    The apparatus of claim 34, wherein at least one of the keys of the root

2    node further includes a data element.

1    36.    The apparatus of claim 34, wherein at least one of the keys of the root

2    node further includes a pointer to an associated data element.


1    37.    The apparatus of claim 34, wherein the first value includes a lower bound

2    of the range and the second value includes an upper bound of the range.


1    38.    The apparatus of claim 34, wherein one of the keys of the root node

2    includes a pointer to a set of data elements.


1    39.    The apparatus of claim 38, wherein the set of data elements comprises a

2    linked list.


1    40.    The apparatus of claim 38, wherein each data element of the set is

2    associated with the range of the one key.


1    41.    The apparatus of claim 38, wherein one data element of the set is further

2    associated with another one of the keys of the root node.


1    42.    The apparatus of claim 38, wherein the set of data elements is prioritized.

1　　　43.　　The apparatus of claim 42, wherein a highest priority data element of the

2　set of data elements corresponds to a data element having a longest length prefix.


1　　　44.　　The apparatus of claim 34, further comprising a temporary node stored in

2　the memory, the temporary node including a number of keys that is less than a minimum

3　number of keys.


1　　　45.　　The apparatus of claim 34, further comprising a temporary key stored in

2　the memory, the temporary key having a range overlapping with the range of at least one

3　of the keys in the root node.


1　　　46.　　The apparatus of claim 34, wherein the range of the child node is between

2　the ranges of two sequential keys.


1　　　47.　　The apparatus of claim 34, wherein the range of the child node is beyond

2　the range of an end key of the number of keys.


1　　　48.　　The apparatus of claim 34, further comprising a processing device coupled

2　with the memory.

1    49.    The apparatus of claim 48, wherein the processing device includes logic to

2    generate the data structure.


1    50.    The apparatus of claim 48, further comprising a set of instructions stored

2    in the memory that, when executed on the processing device, generate the data structure

3    in the memory.


1    51.    The apparatus of claim 48, wherein the processing device includes a set of

2    instructions stored thereon that, when executed on the processing device, generate the

3    data structure in the memory.


1    52.    An article of manufacture comprising:

2    a machine accessible medium providing content that, when accessed by a machine,

3    causes the machine to

4        store in a memory a root node, the root node including a number of sequential

5            keys, each key including a first value and a second value, the first and

6            second values of each key defining a range for that key, wherein the

7            ranges of the number of key are non-overlapping; and

8        store in the memory a pointer associated with the root node, the pointer

9            identifying a child node, the child node having a range outside the range of

10            each key in the root node.

1       53.     The article of manufacture of claim 52, wherein at least one of the keys of

2    the root node further includes a data element.

1       54.     The article of manufacture of claim 52, wherein at least one of the keys of

2    the root node further includes a pointer to an associated data element.

1       55.     The article of manufacture of claim 52, wherein the first value includes a

2    lower bound of the range and the second value includes an upper bound of the range.

1       56.     The article of manufacture of claim 52, wherein one of the keys of the root

2    node includes a pointer to a set of data elements.

1       57.     The article of manufacture of claim 56, wherein the set of data elements

2    comprises a linked list.

1       58.     The article of manufacture of claim 56, wherein each data element of the

2    set is associated with the range of the one key.

1       59.     The article of manufacture of claim 56, wherein one data element of the

2    set is further associated with another one of the keys of the root node.

1      60.      The article of manufacture of claim 56, wherein the set of data elements is

2      prioritized.


1      61.      The article of manufacture of claim 60, wherein a highest priority data

2      element of the set of data elements corresponds to a data element having a longest length

3      prefix.


1      62.      The article of manufacture of claim 52, wherein the content, when

2      accessed, further causes the machine to store in the memory a temporary node including a

3      number of keys that is less than a minimum number of keys.


1      63.      The article of manufacture claim 52, wherein the content, when accessed,

2      further causes the machine to store in the memory a temporary key, the temporary key

3      having a range overlapping with the range of at least one of the keys in the root node.


1      64.      The article of manufacture of claim 52, wherein the range of the child

2      node is between the ranges of two sequential keys.

1       65.    The article of manufacture of claim 52, wherein the range of the child

2    node is beyond the range of an end key of the number of keys.

1       66.    The article of manufacture of claim 52, wherein the number of sequential

2    keys are stored in contiguous memory locations of the memory.